Service Manual

Datascope
Viewstation OR™

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NORTH AMERICA

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Service Manual

Datascope
Viewstation OR™

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NORTH AMERICA

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Foreword v
Warnings, Precautions and Notes v
Warnings vi
Precautions vii
How To Get Help vii
Instrument Description ..... 1 - 1
Introduction ..... 1 - 2
Overview ..... 1 - 2
Core Functions ..... 1 - 2
Connectivity ..... 1 - 3
Viewstation OR Block Diagrams ..... 1 - 4
Basic Configuration ..... 1 - 4
Multiple Display Configuration ..... 1 - 5
System Modules, Components, and Peripherals ..... 1 - 5
Viewstation OR CPU ..... 1 - 5
Keyboard, Video, and Mouse/Touch Pad (KVM) Extender ..... 1 - 5
Network Switches ..... 1 - 6
Mouse/Touch Pad ..... 1 - 6
Displays ..... 1 - 6
Supplied ELO-Compatible Touch Screen Display ..... 1 - 6
Customer Supplied Compatible Displays ..... 1 - 6
Theory of Operation ..... 1 - 7
CPU ..... 1 - 7
Motherboard ..... 1 - 8
Motherboard connections via PCI and AGP connectors ..... 1 - 8
System Hard Drive ..... 1 - 8
CD-ROM Drive ..... 1 - 8
AGP Graphics Dual Display Card ..... 1 - 8
ATX Power Supply ..... 1 - 8
3.5 inch Floppy Drive ..... 1 - 8
Independent Display ..... 1 - 8
Repair Information ..... 2 - 1
Introduction ..... 2 - 2
Safety Precautions ..... 2 - 2
Equipment and Special Tools Required ..... 2 - 2
Troubleshooting ..... 2 - 3
Disassembly Instructions ..... 2 - 6
Cover Removal ..... 2 - 6
Front Panel Removal ..... 2 - 6
Power Supply Removal ..... 2 - 6
AGP Video Board Removal ..... 2 - 6
Auxiliary Fan Removal ..... 2 - 6
System Hard Drive Removal ..... 2 - 6
Floppy Drive and Disclosure Hard Drive(s) Removal ..... 2 - 6
CD-ROM Drive Removal ..... 2 - 7
Motherboard Removal ..... 2 - 7
Re-assembly Instructions ..... 2 - 8
Motherboard Assembly ..... 2 - 8
AGP Video Board Assembly ..... 2 - 8
Power Supply Assembly ..... 2 - 8
Floppy Drive ..... 2 - 8
CD-ROM Drive and System Hard Drive ..... 2 - 8

Auxiliary Fan ..... 2 - 9
CMOS Battery Replacement ..... 2 - 9
Closing the Unit ..... 2 - 9
Rebooting and Testing the System ..... 2 - 9
Parts Replacement ..... 3 - 1
Introduction ..... 3 - 2
Available Replacement Parts and Assemblies ..... 3 - 2
Product Variations ..... 3 - 2
Exchange Program ..... 3 - 2
Parts Pricing Information ..... 3 - 2
Ordering Information ..... 3 - 3
Preventative Maintenance ..... 4 - 1
ELO Compatible Touch Screen Displays ..... 4 - 2
Care and Cleaning of an LCD Display ..... 4 - 2
Care and Cleaning of a Touch Screen ..... 4 - 2
Viewstation OR CPU ..... 4 - 3
Cleaning ..... 4 - 3
Visual Inspection ..... 4 - 3
Fans ..... 4 - 3
Motherboard Backup Battery Replacement ..... 4 - 3
Viewstation OR Network ..... 4 - 3
System Maintenance ..... 4 - 4
Preventative Maintenance ..... 4 - 4
Connections and Configuration ..... 5 - 1
Hardware Installation Parts ..... 5 - 2
Connections and Configuration ..... 5 - 3
Touch Pad, Mouse and AC Power Cable Connection ..... 5 - 3
Spectrum OR Connection to Viewstation OR CPU ..... 5 - 3
Display Connection to Viewstation OR CPU ..... 5 - 4
Single Display ..... 5 - 4
Two Displays ..... 5 - 4
Spectrum OR Communication Configuration ..... 5 - 5
Appendix A ..... 6 - 1
Installing Viewstation OR Software ..... 6 - 2
Introduction ..... 6 - 2
Required Parts and Equipment ..... 6 - 2
Prerequisites ..... 6 - 2
Software Installation ..... 6 - 2
Appendix B ..... 7 - 1
CMOS Setup/Verification ..... 7 - 2
BIOS SETUP Pentium 4 Motherboard ..... 7 - 2
Independent Display Functional Requirements ..... 7 - 7
Electrical Requirements ..... 7 - 7
Power Supply ..... 7 - 7
Display Resolution ..... 7 - 7
Display Aspect Ratio ..... 7 - 7
Color Support ..... 7 - 7
Image Brightness ..... 7 - 7
Image Contrast ..... 7 - 7
Viewing Angle ..... 7 - 7
Mechanical Requirements ..... 7 - 8

Connectors (Cable Termination at the Viewstation OR PC) ..... 7 - 8
Mounting ..... 7 - 8
Environmental and Agency Requirements..... 7 - 8
Compliance ..... 7 - 8

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Foreword

The Viewstation OR Service Manual is a guide for technically-qualified personnel who perform maintenance and/or repair on the Viewstation OR and its Ethernet network.

This manual conveys system-wide information that is divided into sections. For quick reference, each chapter's title page displays a table of contents that indicates, sectionally, the topics covered.

This publication may have been updated to reflect product design changes and/or manual improvements.

NOTE: Unauthorized servicing may void the remainder of the warranty. Check with the factory or with a local authorized Service Representative to determine the warranty status of a particular instrument.

Warnings, Precautions and Notes

Please read and adhere to all warnings, precautions, and notes listed here and in the appropriate areas throughout this manual.

A **WARNING** is provided to alert the user to potential serious outcomes (death, injury, or serious adverse events) to the patient or the user.

A **CAUTION** is provided to alert the user signaling that special care is necessary for the safe and effective use of the device. They may include actions to be taken to avoid effects on patients or users that may not be potentially life threatening or result in serious injury, but about which you should be aware.

A **NOTE** is provided when additional general information is applicable.

Warnings

WARNING: Do not attempt to use the Viewstation OR, including cabling for any purpose other than its intended use.

WARNING: Route cables neatly. Ensure cables are not in the way of patient or hospital personnel.

WARNING: Loading any unauthorized software including utilities on the Viewstation OR will cause the application to no longer be suitable for medical patient monitoring use.

WARNING: Do not connect or attempt to connect or reconfigure any equipment to the Viewstation OR unless Mindray DS USA, Inc. has explicitly approved the hardware in writing. This includes all commercially available networking hardware i.e., switches, routers etc.) or peripherals (i.e., Printers) even if they are the same brand as recommended by the configuration of the system and supplied by Mindray DS USA, Inc.

WARNING: Do not attempt to load any devices or device drivers onto the Viewstation OR. If the user connects or attempts to connect any equipment to the Viewstation OR, it may not operate as intended.

WARNING: Only qualified and trained Service Personnel should attempt to service the equipment. Service is defined as any activity requiring the cover to be removed for internal adjustments, parts replacements, repairs or software upgrades of any kind to insure compatibility.

WARNING: To insure compatibility with the operating system and applications software, use only supplied and/or approved components to repair any part of the Viewstation OR. Use of unauthorized software, devices, accessories, or cables other than those approved may render the application unsuitable for medical patient monitoring. It may also result in increased electromagnetic Emissions or decreased Immunity of the system.

WARNING: All of the equipment on the Viewstation OR network must utilize the hospital emergency power system. Failure to do so will result in loss of monitoring during extended periods of power failure.

WARNING: Do not put MPSOs (Multiple Portable Socket Outlets, i.e., multiple outlet extension cords) used with the Viewstation OR on the floor. Do not overload MPSOs. Use only MPSOs that comply with the requirements of IEC 60601-1-1.

WARNING: Do not clean the display while it is ON and/or plugged in.

WARNING: Disconnect AC power prior to any disassembly.

Precautions

CAUTION: This system is intended for use in a hospital or clinical setting and to be operated by trained and authorized personnel who are acting on the orders of a physician. Its purpose is the real time monitoring of a patient's physiological parameters.

CAUTION: For proper operation do not obstruct the fan air holes.

CAUTION: For proper operation never place fluids on top of this equipment. In case of accidental spillage, wipe clean immediately and have the system serviced to ensure no hazard exists.

CAUTION: For proper operation, do not use any components of the Viewstation OR network with a frayed or damaged power cord.

CAUTION: Do not operate the Viewstation OR or any of its components if they have been dropped or the case has been damaged.

CAUTION: Use only the supplied power cords. If a substitute is necessary, only use Hospital Grade power cords.

CAUTION: For proper operation use only approved accessories with this product.

CAUTION: Dispose of single use items in accordance with hospital policy.

CAUTION: Proprietary software is written directly to some of the PC boards within the CPU. Replacement of the PC boards with off-the-shelf PC boards may compromise the proper operation of the Viewstation OR.

How To Get Help

Mindray DS USA, Inc. maintains a worldwide network of Sales, Clinical, and Service representatives.

For U.S., Canada, and Latin America please contact:

Mindray DS USA, Inc.	Sales Tel: (800) 288-2121
800 MacArthur Blvd.	Sales Fax: (800) 926-4275
Mahwah, NJ 07430	Sales Tel: (201) 995-8237
	Sales Fax: (201) 995-8659
	Service Tel: (800) 288-2121
	Service Fax: (201) 995-0119

For International Offices, refer to the contact information at the end of this service manual.

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1.0 *Instrument Description*

1.1 Introduction 1-2
1.2 Viewstation OR Block Diagrams 1-4
1.3 System Modules, Components, and Peripherals 1-5
1.4 Theory of Operation 1-7

1.1 Introduction

This section of the service manual initially provides a high-level overview of the Viewstation OR network, followed by more detailed information.

1.1.1 Overview

The Viewstation OR network is a comprehensive patient care monitoring system designed for use in a hospital setting. The system is intended to be installed and used in a fixed, non-portable, permanent location that serves as a secondary viewing station. The Viewstation OR network consists of the following modules:

- Viewstation OR CPU
- Spectrum OR Bedside Monitor
- Independent Display
- Proprietary Ethernet Network

Hardware and software components within each module provide system-wide functionality and connectivity.

The monitoring capacity of the system is one Spectrum OR that is connected to the Viewstation OR CPU through the Ethernet network.

This service manual focuses on the Viewstation OR and Ethernet modules. The Viewstation OR is a combination of both hardware (e.g., CPU and display) and software components (i.e., Viewstation OR software application).

1.1.2 Core Functions

The Viewstation OR is capable of displaying the following digital physiological parameters as monitored by the Spectrum OR:

1. Heart Rate (BPM)
2. SpO_2 (%SAT)
3. 4 Invasive Blood Pressures (SYS/DIA/Mean)
4. Non-Invasive Blood Pressure (SYS/DIA/Mean)
5. Two Temperatures
6. Respiration Rate (RR)
7. Inspired/Expired CO_2
8. CO
9. CI
10. CCO
11. CCI
12. SvO_2
13. PAWP

The Viewstation OR is capable of displaying the following waveforms as monitored by the Spectrum OR:

1. Up to seven waveforms of ECG (dependent upon the ECG lead set that is being utilized)
2. Up to four waveforms of Invasive Blood Pressure
3. One waveform of Pulse Oximetry (SPO_2)
4. One waveform of Respiration
5. One waveform of CO_2
   - The maximum number of waveforms displayable is 12 and the minimum number is 3.
   - Waveforms are acquired externally from the Spectrum OR™ and then presented to the Viewstation OR either directly by a crossover Ethernet cable or through an Ethernet switch via the E-LAN Protocol.

1.1.3 Connectivity

The Viewstation OR network is a single channel system that is designed for displaying patient data that is received from a Spectrum OR™ monitor via an Ethernet network.

1.2 Viewstation OR Block Diagrams

The following block diagrams illustrate wired configurations for the Viewstation OR network.

1.2.1 Basic Configuration

The basic configuration is a network of devices that transmits patient data from a Spectrum OR™ monitor to a single, independently configurable display.

As depicted in Figure 1-1, the basic configuration of the Viewstation OR is:

- Spectrum OR Monitor
- Viewstation OR computer (CPU)
- Independent Display
- Touch Pad

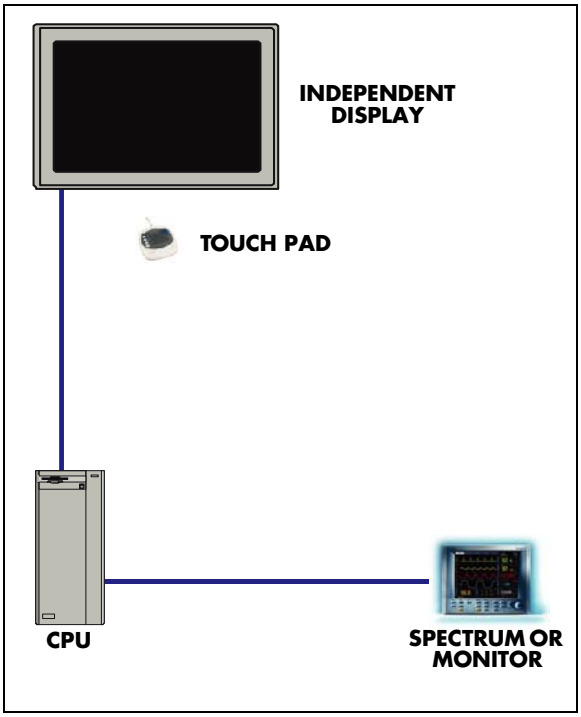

FIGURE 1-1 Basic Components of the Viewstation OR

The basic configuration can be varied to include two identically configured displays per Viewstation OR computer and may also access the Spectrum OR monitor through an Ethernet network switch (see Figure 1-2).

1.2.2 Multiple Display Configuration

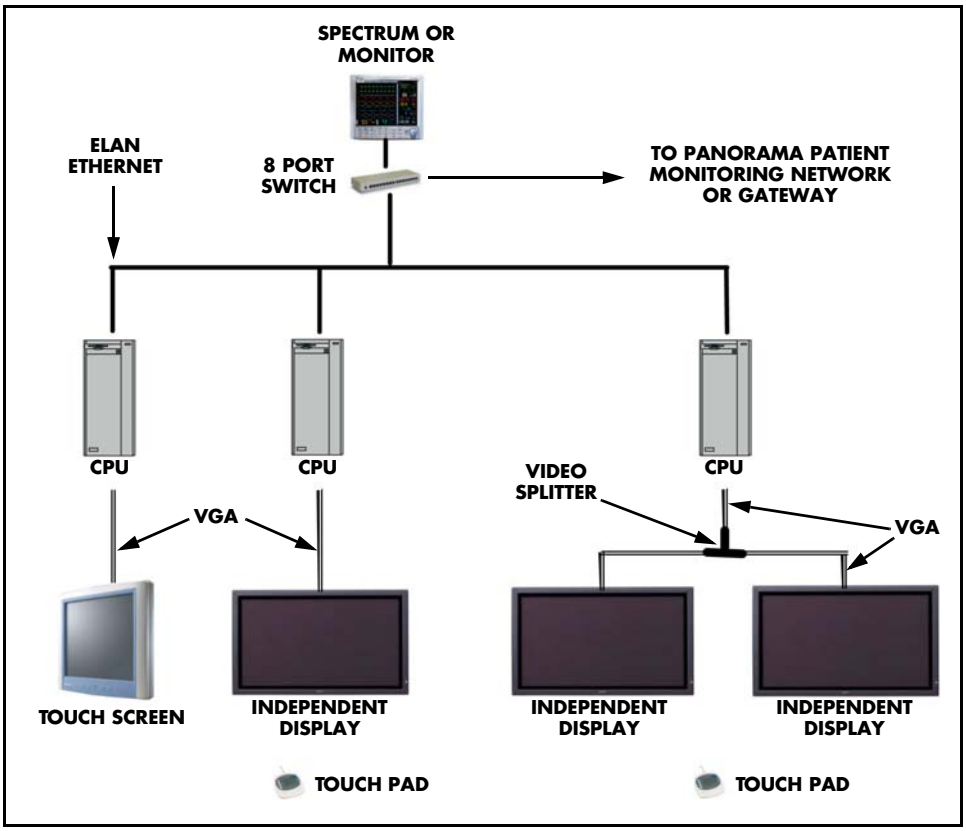

FIGURE 1-2 Example Multiple Display Configuration of the Viewstation OR

1.3 System Modules, Components, and Peripherals

1.3.1 Viewstation OR CPU

The application software and the Windows® XP Embedded operating system reside on the system hard drive within the Viewstation OR CPU.

Independent displays provide a graphic display of patient waveforms and other data.

1.3.2 Keyboard, Video, and Mouse/Touch Pad (KVM) Extender

- The KVM Extender is used when displays, keyboard and mouse/touch pad are not located in the same room as the Viewstation OR. The KVM Extender consists of a transmitter and receiver connected via CAT5 cable.
- The transmitter is located with the Viewstation OR CPU, and the receiver is located with the independent display. Data signals are carried by CAT5 Ethernet cable and link the Viewstation OR CPU with the display(s).

NOTE: Both the transmitter and the receiver require a 110 VAC connection.

- The extenders can be separated by a maximum of 400 ft. (122 m.) cable distance with a screen resolution of 1280 x 1024.

1.3.3 Network Switches

- An Ethernet switch is used if there are multiple Spectrum ORs on the network or if there is more than one Viewstation OR CPU connected to the Spectrum OR.
  - The switch routes data from the Spectrum OR™ to all Viewstation OR CPUs on the network.
  - The switch can be the Panorama E-LAN switch or an independent switch dedicated to the Viewstation OR network.

1.3.4 Mouse/Touch Pad

- The mouse/touch pad enables changes to be made on the Independent Display.
- The mouse/touch pad is connected to the KVM receiver via the PS2 mouse connector.

1.3.5 Displays

1.3.5.1 Supplied ELO-Compatible Touch Screen Display

- A Surface Acoustical Wave (SAW) touch screen is supported as the standard input device on the 19" display.
- The touch screen operates independent of a mouse or touch pad interface.
- The actual touch screen and its controller are integrated into the display.
- The touch screen communication is accepted by Viewstation OR via a serial port.
- Use of the touch screen does not preclude the use of a mouse or touch pad.

1.3.5.2 Customer Supplied Compatible Displays

- See Appendix B or contact Customer Support for requirements.

1.4 Theory of Operation

The system design is based on an ATX computer architecture. Basic system data processing configuration includes an ATX computer, an Independent Display with Mouse/Touch Pad, and an Ethernet distribution network.

CAUTION: Proprietary software is written directly to some of the PC boards within the CPU. Replacement of the PC boards with off-the-shelf PC boards may compromise the proper operation of the Viewstation OR.

1.4.1 CPU

Each of the Viewstation OR CPU hardware items (e.g., hard drives, controls, etc.) are identified below. The hardware is marked with labels identifying all connections.

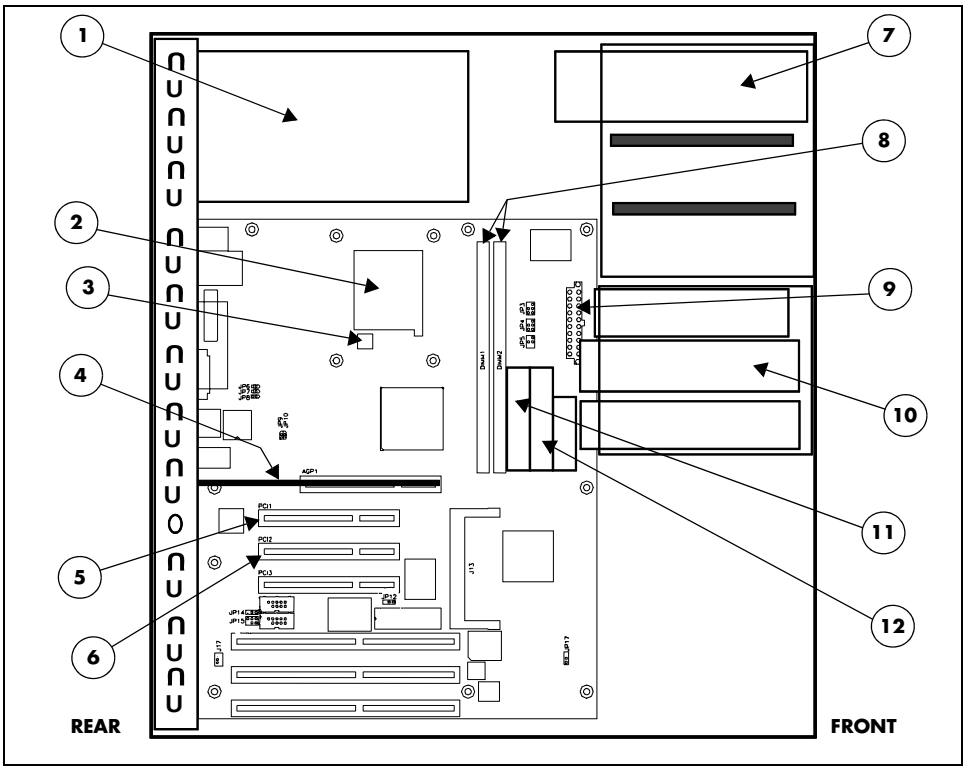

FIGURE 1-3 Viewstation OR CPU (Internal Side View)

1. ATX Power Supply
2. Microprocessor/Heat Sink/Fan
3. 12V power input
4. AGP Video Card
5. PCI 1 (not used)
6. PCI 2 (not used)
7. CD-ROM Drive
8. Memory Modules (2)
9. ATX Power Connector
10. System Hard Drive
11. IDE 1 connector
12. IDE 2 connector

1.4.2 Motherboard

The motherboard is the physical platform on which the computer's electronic circuitry and processors reside. The computer's microprocessor is docked on the motherboard. The microprocessor executes the application software. The following components also reside on the motherboard:

- Random Access Memory (RAM)
- Read Only Memory, Basic Input/Output System (ROM BIOS)
- Associated Processing Logic
- EIDE controller for 3.5" floppy drive and system hard drives
- Mouse/touch pad and keyboard controllers
- Network Interface Ports
- Comm Ports

1.4.2.1 Motherboard connections via PCI and AGP connectors

- Serial Interface Comm Ports
- AGP Graphics Display Card

1.4.3 System Hard Drive

The system hard drive stores the Operating System (Windows XPE®) and Viewstation OR application software. (It is controlled by EIDE controller circuitry on the motherboard.)

1.4.4 CD-ROM Drive

The CD-ROM drive is used to load software and to copy error logs. (It is controlled by EIDE controller circuitry on the motherboard.)

1.4.5 AGP Graphics Dual Display Card

The AGP Graphics Display card sits in the J19 slot on the motherboard.

1.4.6 ATX Power Supply

The ATX switching Power Supply provides power for all electronic assemblies within the Viewstation OR CPU. Regulated voltages are +5, -5, +12, and -12 Volts. The power supply has a universal AC input and is rated for 460 Watts (minimum).

1.4.7 3.5 inch Floppy Drive

This drive is installed in the system but is not currently used for any applications.

1.4.8 Independent Display

All text and graphics are presented on an Independent Display that utilizes an external AC power supply. Graphics information is transmitted through a graphics cable from an AGP Graphics Card. The Independent Display follows the specifications detailed in section 7.2, "Independent Display Functional Requirements".

2.0 *Repair Information*

2.1 Introduction 2-2
2.2 Safety Precautions 2-2
2.3 Equipment and Special Tools Required 2-2
2.4 Troubleshooting 2-3
2.5 Disassembly Instructions 2-6
2.6 Re-assembly Instructions 2-8

2.1 Introduction

This section provides the necessary technical information to perform repairs to the system. The most important prerequisites for effective troubleshooting are a thorough understanding of the system functions and the theory of operation. If necessary, refer to the appropriate Viewstation OR Operating Instructions Manual (P/N 0070-00-0663-01), which describes instrument functions and features in full detail.

2.2 Safety Precautions

In the event the instrument covers are removed, make certain you observe the following warnings and general guidelines:

- Do not short component leads together.
- Observe proper ANTI-STATIC precautions.

2.3 Equipment and Special Tools Required

You will need the following equipment and/or special tools when performing repairs on the system:

- Anti-Static Wrist Strap
- Anti-Static Mat
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- Slotted Screwdriver
- Laptop Computer with 100MB Network Interface Card (used for network troubleshooting)

2.4 Troubleshooting

Prior to troubleshooting a network problem, check the following areas:

- All AC and DC power connections are secure.
- All Ethernet cable connections are secure.
  - Affected cable runs should be tested with a cable tester for continuity.
- IP addresses
  - Valid IP addresses should be verified for all devices on the Panorama Patient Monitoring Network.
- Bedside monitor configuration
  - Network configuration should be verified within the monitor's installation menu. Refer to ''Spectrum OR Communication Configuration'' on page 5-5 of this service manual.
- Viewstation OR configuration
  - Patient and IP address configuration should be verified

The display or the Viewstation OR CPU does not come ON

1. Verify the power LED on the display is ON. (This is usually located on the front panel.)
2. On LCDs, turn OFF the power switch and turn it back on. Verify the logo is briefly displayed. If the **No Signal** message is displayed on the screen, no video signals are reaching the display.
3. Verify that the cable between the display and the CPU is making a good connection, that the connector screws are tight, and pins on the connectors are straight.
   - If the problem persists, it is likely due to a problem within the CPU.
4. Verify that AC power switch is ON at the Viewstation OR CPU.
5. Reboot the Viewstation OR CPU. Verify that the power and hard drive LEDs are illuminated and the fans are operating.
   - If the display still does not come ON, the problem is likely within the CPU.
   - If the hard drive LED does not illuminate, the problem is likely related to the CPU or the motherboard.
   - If the fans are not operating, the problem is likely the power supply.

The display comes ON but the Viewstation OR CPU does not complete “self-test”

Note the point at which the self-test stopped (e.g., passed through the memory check, CMOS check, Drive check). Depending on where it stopped this may mean replacement of the motherboard, memory chip or the hard drive is necessary.

The unit went through self-test, but did not get to the Viewstation OR operating screen. It stays at the blue screen - no desktop icons

Clear the error and event logs (contact a Service Representative for instructions) and save the config tool.

The mouse/touch pad does not function

1. Verify that the connections at the rear of the Viewstation OR CPU are secure and that they are in the appropriate locations.
2. Check connections to the KVM Extender (Transmitter & Receiver).
3. Re-power the KVM Extender by disconnecting AC power from the transmitter and receiver.
4. Reboot the system. Is the mouse functional?
   - If not, install a new PS2 touch pad mouse and reboot the system again.
5. Is the touch pad mouse functional now?
   - If not, this may mean replacement of the Mother PCB.

No touch screen response (only on supplied touch screen displays)

1. Verify that the connections at the rear of the CPU are secure and that they are in the appropriate locations.
2. Check connections to the KVM Extender (Transmitter & Receiver).
3. Power cycle the KVM Extender by disconnecting AC power from the transmitter and receiver and then reconnecting the AC power.
4. Clean the touch screen panel.
5. Reboot the system. Is the touch screen functional?
   - If not, this may mean replacement of the touch screen display or the touch screen controller card.

Network Communication Loss From a Spectrum OR™ Monitor

1. Verify that the Ethernet connections between the Viewstation OR CPU and the Spectrum OR are secure. Verify that the LEDs on the network port of the Viewstation OR CPU are illuminated as follows:
   - left-hand LED - continuously ON
   - right-hand LED - flashing
2. If the connection between the Spectrum OR and the Viewstation OR CPU is a direct connection via a crossover Ethernet cable, verify that the cable connection is secure.
3. If the connection between the Viewstation OR CPU and the Spectrum OR uses an Ethernet switch:
   - Verify that the cable connections between the Ethernet switch and the Viewstation OR CPU are secure.
   - Verify that the cable connections between the Ethernet switch and the Spectrum OR are secure.
   - Power cycle the Ethernet switch.
     - Verify that the Power LED on the Ethernet switch is illuminated.
     - Each port on the Ethernet switch has a corresponding Port Status light that indicates that the cable connection has been established. For each cable that is connected to the Ethernet switch, verify that the corresponding Port Status light is illuminated. If the Port Status light is not illuminated, plug the cable into an available port and verify that the Port Status light for this new port is illuminated.
4. Verify that the LEDs on the Comm Port of the Spectrum OR are illuminated as follows:
   - Yellow LED - continuously ON
   - Green LED - flashing

   If either LED is not illuminated, it may indicate that the Comm Port is defective.

2.5 Disassembly Instructions

This section provides information to assist the technician in disassembly and removal of individual components for replacement. The displays and network switches do not contain any user-replaceable parts and are serviced on an exchange or replacement basis.

WARNING: Disconnect AC power prior to any disassembly.

2.5.1 Cover Removal

1. Remove the two (2) screws on the rear of the chassis.
2. Slide the cover toward the rear and lift off.

2.5.2 Front Panel Removal

Grab the panel in the opening at the bottom and lift up and away from the chassis.

2.5.3 Power Supply Removal

1. Disconnect the ATX power connector and the 12V power connector from the motherboard.
2. Disconnect the power connectors from the floppy drive, CD-ROM drive, system hard drive, and disclosure hard drives.
3. Remove the four (4) screws securing the power supply to the rear of the chassis.

2.5.4 AGP Video Board Removal

1. Remove the screw securing the board to the chassis.
2. Lift the board out of the AGP slot.

2.5.5 Auxiliary Fan Removal

1. Disconnect the DC power connector from the motherboard.
2. Remove the four (4) screws securing the fan to the rear of the chassis.

2.5.6 System Hard Drive Removal

1. Remove the four (4) screws (1 internal, 3 external) securing the hard drive rack.
2. Disconnect the power connectors and ribbon cables from the drive(s).
3. Pull the system hard drive rack out through the front of the chassis.

2.5.7 Floppy Drive and Disclosure Hard Drive(s) Removal

1. Remove the four (4) screws securing the 3.5-inch floppy drive to the drive rack.
2. Remove the cable retainer bracket from the floppy drive.
3. Loosen the screws securing the cable retainer bracket to the floppy drive. Remove the cable retainer bracket.
4. Disconnect the power connectors and ribbon cables from the drive(s).
5. Remove the floppy drive from the drive rack.

2.5.8 CD-ROM Drive Removal

1. Remove the two (2) screws securing the drive to the chassis.
2. Press on the locking lever and pull the drive out of the chassis.

2.5.9 Motherboard Removal

1. Remove the ATX power supply connector from J10 on the motherboard.
2. Remove the ATX 12 V power connector from J12 on the motherboard.
3. Disconnect the 40-pin ribbon cable from the CD-ROM drive to the IDE2 connector.
4. Disconnect the 40-pin ribbon cable from the hard drives to the IDE1 connector.
5. Disconnect the 34-pin ribbon cable from the Floppy drive to the FDD1 connector.
6. Disconnect the ribbon cable from P0 serial port to J15 on the motherboard.
7. Disconnect the ribbon cable from P1 serial port to J16 on the motherboard.
8. Disconnect the ribbon cable from the unmarked serial port to J11 on the motherboard.
9. Disconnect the speaker connector to pins 1-4 (red to pin 1) on J20.
10. Disconnect the green LED connector to pins 11-13 (green to pin 11) on J20.
11. Disconnect the power switch connector to pins 7 and 17 (blue to pin 7) on J20.
12. Disconnect the reset switch connector to pins 9 and 19 (red to pin 9) on J20.
13. Disconnect the red LED connector to pins 10 and 20 (black to pin 10) on J20.
14. Remove the 10 screws that secure the motherboard to the chassis.
15. Remove the six Standoffs and washers from the back of the CPU. 2 each on the unused serial port, the parallel port and the unused VGA port.
16. Remove the motherboard from the chassis.

2.6 Re-assembly Instructions

This section provides information to assist the technician in re-assembling components of the Viewstation OR CPU. See FIGURE 1-3 for reference.

2.6.1 Motherboard Assembly

1. Secure the motherboard to the chassis using 10 screws.
2. Attach the six Standoffs and washers on the back of the CPU. 2 each on the unused serial port, the parallel port and the unused VGA port.
3. Connect the ATX power supply connector to J10 on the motherboard.
4. If present, connect the ATX 12 V power connector to J12 on the motherboard.
5. Connect the 40-pin ribbon cable from the CDROM drive to the IDE2 connector.
6. Connect the 40-pin ribbon cable from the hard drives to the IDE1 connector.
7. Connect the 34-pin ribbon cable from the Floppy drive to the FDD1 connector.
8. Connect the ribbon cable from P0 serial port to J15 on the motherboard.
9. Connect the ribbon cable from P1 serial port to J16 on the motherboard.
10. Connect the ribbon cable from the unmarked serial port to J11 on the motherboard.
11. Connect the speaker connector to pins 1-4 (red to pin 1) on J20.
12. Connect the power LED connector to pins 11-13 (green to pin 11) on J20.
13. Connect the power switch connector to pins 7 and 17 (blue to pin 7) on J20.
14. Connect the HDD LED connector to pins 10 and 20 (black to pin 10) on J20.

2.6.2 AGP Video Board Assembly

1. Plug the Graphics adapter into the AGP slot on the Motherboard.
2. Secure the board to the chassis using one (1) screw.

2.6.3 Power Supply Assembly

1. Secure the power supply to the rear of the chassis with 4 screws.
2. Connect the ATX power supply connector to J10 on the motherboard.
3. Connect the ATX 12 V power connector to J12 on the motherboard.
4. Plug a power connector onto each hard drive and into the floppy drive.

2.6.4 Floppy Drive

1. Install the replacement drive into the drive rack and secure with four (4) screws.
2. Connect the power and ribbon cables to the rear of the drive.
3. Slide the drive rack into the front of the chassis. Secure the drive rack with three (3) screws.
4. Install a cable retainer bracket to each of the drives.
5. Tighten the screws that secure the cable retainer brackets.

2.6.5 CD-ROM Drive and System Hard Drive

1. Install the replacement drive into the chassis.

2. Connect the power and ribbon cables to the rear of the drive.
3. Secure the drive to the chassis with the four (4) screws (two on either side).

2.6.6 Auxiliary Fan

1. Connect the DC power connector to the fan.
2. Verify that the label on the fan is facing the rear of the chassis, which indicates the airflow is blowing out.
3. Secure the fan to the rear chassis with the four (4) screws.

2.6.7 CMOS Battery Replacement

Locate and remove the existing battery from the motherboard and replace it with a new CR 2032 battery (3V). The positive terminal (+) should be visible. After battery replacement, verify/set up the CMOS per the CMOS Setup/Verification information on page 7-2.

2.6.8 Closing the Unit

1. Install the top and secure it with four (4) screws.

2.6.9 Rebooting and Testing the System

1. Reconnect the cables to the Viewstation OR CPU.
2. Power ON the CPU and the display.
3. If the system hard drive has been replaced, the operating software must be reloaded. Use the instructions included with the system software CDs to load the software and configure the system. If the instructions are not available, contact your local Service Representative or Technical Support Department.

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3.0 *Parts Replacement*

3.1 Introduction 3-2
3.2 Available Replacement Parts and Assemblies 3-2
3.3 Product Variations 3-2
3.4 Exchange Program 3-2
3.5 Parts Pricing Information 3-2
3.6 Ordering Information 3-3

3.1 Introduction

This section of the service manual contains a list of replacement parts for the Viewstation OR network.

3.2 Available Replacement Parts and Assemblies

Mindray DS USA, Inc. provides replacement parts at a board or assembly level. In most cases, individual components on boards and assemblies are not available. Contact the Service Department or your local authorized Service Representative for additional details.

3.3 Product Variations

Product variations, due to differences in line voltages or option differences, may require different components. These variations are reflected, where necessary, on the parts lists.

3.4 Exchange Program

Mindray DS USA, Inc. offers an exchange program for many circuit boards and assemblies. This program provides the most expedient method of servicing the equipment. A standard charge for this service is made. Contact the National Repair Center in Mahwah, New Jersey for details concerning this program.

The printed circuit boards make extensive use of multi-layer and surface-mount technology. Individual component replacement is not recommended on these boards. Board exchange or replacement is the most efficient method of repair for these types of assemblies.

Circuit board and assemblies that show evidence of improper repair techniques and that are damaged in the process are not considered for exchange. Damaged boards are invoiced at full value and no exchange credit is applied.

3.5 Parts Pricing Information

Current replacement parts and exchange charges are determined by contacting the Order Entry Department.

3.6 Ordering Information

Replacement parts and assemblies are available. Please follow these guidelines when ordering replacement items for the Viewstation OR network.

1. Include the unit's model and serial number.
2. Include the software part number and revision.
3. Include the part number exactly as it appears in the Parts List.
4. Include the description of the part.

NOTE: Mindray DS USA, Inc. maintains a policy of continuous development of product improvement and reserves the right to change materials, specifications, and prices without notice.

The following table lists the parts and part numbers associated with the Viewstation OR CPU.

DESCRIPTION	PART NUMBER
Power Supply (ATX)	0014-00-0075-01
AGP Display Board	0671-00-0220-02
Motherboard Pentium 4	0671-00-0052-01
CD-RW	0992-00-0178-01
System Hard Drive	0992-00-0084-07
Floppy Disk Drive	0992-00-0121
CMOS Battery	0146-00-0078
Auxiliary Fan (CPU Case Only)	0119-00-0214-03
Cable, IDE Drive	0012-00-1546-01
Cable, Floppy Drive	0012-00-1354
AC Power Cord (110V Domestic)	0012-25-0001
Keyboard (PS/2)	0992-00-0108
Mouse (PS/2)	0992-00-0233-01
Patch Cable, 10', CAT 5E (crossover)	0012-00-1392-05
Patch Cable, 6', straight pinned	0012-00-1274-01
Patch Cable, 1', straight pinned	0012-00-1274-04
Patch Cable, 2', straight pinned	0012-00-1274-05
Patch Cable, 3', straight pinned	0012-00-1274-06
Patch Cable, 10', straight pinned	0012-00-1274-07
ESD Protector Adapter	0137-00-0001-01
Touch Pad	0992-00-0238-01
Ethernet Switch (5 port)	0992-00-0248-01
Ethernet Switch (8 port)	0992-00-0248-02

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4.0 *Preventative Maintenance*

4.1 ELO Compatible Touch Screen Displays 4-2
4.2 Viewstation OR CPU 4-3
4.3 Viewstation OR Network 4-3
4.4 System Maintenance 4-4

4.1 ELO Compatible Touch Screen Displays

The display panel and housing should be cleaned as required, but at least semi-annually.

The following internal cleaning procedures should only be performed by a trained, qualified electronic technician.

NOTE: Never use an abrasive glass cleaner containing highly concentrated ammonia and strong base chemicals since they damage the surface treatment.

WARNING: Do not clean the display while it is ON and/or plugged in.

4.1.1 Care and Cleaning of an LCD Display

Clean the LCD display with a lightly moistened soft cloth.

4.1.2 Care and Cleaning of a Touch Screen

For the best performance, it is recommended that the touch screen display(s) be kept clean. You can use any standard glass cleaner to clean the screen. Always remember, however, to use a cloth or towel to apply the cleaner. Glass cleaner sprayed directly on a display could possibly leak inside a non-sealed unit and cause damage.

Remove fingerprints and stains by using a liquid lens cleaner and a soft cloth.

To prevent scratches on the front panel of the display screen, observe the following precautions when cleaning:

- DO NOT use abrasive cleaning materials to clean a touch screen.
- DO NOT wipe a dry screen.
- DO NOT use alcohol or chlorinated hydrocarbon solvents.
- Use a fine soft-hair brush to carefully brush away dust and dirt particles.
- Use a soft sponge moistened with cleaner solution to wipe the touch screen clean.

4.2 Viewstation OR CPU

The following internal cleaning procedures should only be performed by a trained, qualified electronic technician.

Turn off the AC power and unplug the AC main power cord and all other cables from the rear panel from the Viewstation OR CPU before attempting internal cleaning. Clean the display in an area free of blowing dust, dirt, and lint.

4.2.1 Cleaning

Use an anti-static vacuum to carefully remove accumulated dust, dirt, and lint from the various surface areas. Be careful not to dislodge components, connectors, or printed circuit boards.

4.2.2 Visual Inspection

Perform a visual check to verify that all dust, dirt, and lint has been completely removed, and that connectors and printed circuit boards (PCBs) are properly seated.

4.2.3 Fans

If the power supply fan or the auxiliary fan is noisy or turns too slowly, replace that component. The Power Supply should be replaced as an assembly, rather than replacing its internal fan.

4.2.4 Motherboard Backup Battery Replacement

Locate the battery (BT1) on the motherboard. Remove the battery from its socket and install a new battery, observing the proper polarity. The CPU's CMOS settings will have reset to the manufacturer's defaults, and must be changed to meet company requirements. This must be accomplished prior to returning the unit to use. See ''CMOS Setup/Verification'' on page 7-2.

4.3 Viewstation OR Network

Verify the mechanical integrity of all cables, wires, and network connections, including bedside monitors. Replace any frayed or kinked cables. Test communication integrity with a network analyzer or cable tester.

Check and verify the proper operation of the Status and System LEDs on all switches.

4.4 System Maintenance

4.4.1 Preventative Maintenance

The Viewstation OR network requires periodic cleaning, inspection and testing. Use the following tables for each maintenance procedure:

Displays

ACTIVITY AREA	ACTION	TECHNICAL LEVEL	METHOD	SCHEDULE
Screen	Clean	User	See Operators manual (P/N 0070-00-0663-01)	As required
Touch Screen	Calibrate	User	Built-in system software	As required
Case	Clean	Bio-Medical/ Clinical Engineer	Cloth dampened with mild detergent	Semi-Annually
Cables	Inspect	Bio-Medical/ Clinical Engineer	–	Semi-Annually

CPU

ACTIVITY AREA	ACTION	TECHNICAL LEVEL	METHOD	SCHEDULE
Cooling Fans	Clean	Bio-Medical/ Clinical Engineer	Forced air	Semi-Annually
Power Supply Fans	Clean	Bio-Medical/ Clinical Engineer	Forced air	Semi-Annually
Floppy Drive	Clean	Bio-Medical/ Clinical Engineer	Forced air	Semi-Annually
Connections	Inspect	Bio-Medical/ Clinical Engineer	–	Semi-Annually
Case	Inspect	Bio-Medical/ Clinical Engineer	–	Semi-Annually
Cabling	Inspect	Bio-Medical/ Clinical Engineer	–	Annually

Battery Replacement Information

UNIT	BATTERY TYPE	TYPICAL LIFE
Motherboard (CMOS)	Lithium Coin cell (CR2032 or equivalent)	10 Years

5.0 *Connections and Configuration*

5.1 Hardware Installation Parts 5-2

5.1 Hardware Installation Parts

This section of the manual covers the equipment interconnection and software configuration.

DESCRIPTION	PART NUMBER
5 port switch	0992-00-0248-01
8 port switch	0992-00-0248-02
Mouse	0992-00-0233-01
KVM Extender	0992-00-0150-03
2 port Video Splitter	0992-00-0232-01
Touch Pad	0992-00-0238-01
ELO compatible Touch Screen Display (19")	0160-00-0093-01
Ethernet Patch Cable	0012-00-1274-XX
Ethernet Crossover Patch Cable	0012-00-1392-XX
Ethernet Cable UTP Plenum, Bulk	0175-00-0095-XX
Ethernet Cable UTP Non-Plenum, Bulk	0175-00-0096-XX
Extension VGA Cable	0012-00-1629-XX
VGA cable, Male to Male, 10 FT	0012-00-0994-01

5.2 Connections and Configuration

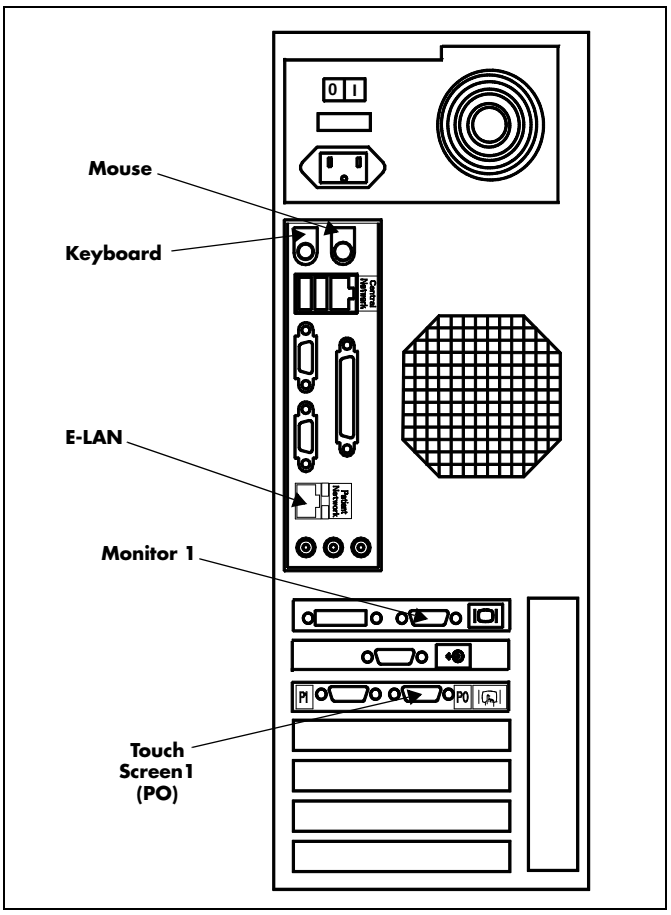

FIGURE 5-1 Viewstation OR CPU Connections

5.2.1 Touch Pad, Mouse and AC Power Cable Connection

The following touch pad, mouse and AC power cable connections to the Viewstation OR CPU are common for all configurations:

- A touch pad or mouse attached to the PS2 mouse port on the Viewstation OR CPU will be used to navigate. An optional PS2 extender cable is available.
- The AC power cable attached to the Viewstation OR CPU is connected to the hospital emergency power supply.

5.2.2 Spectrum OR Connection to Viewstation OR CPU

- For each Spectrum OR that is connected directly to the Viewstation OR CPU, a crossover Ethernet patch cable is used. The cable connects the CS1 port of the Comm Port on the Spectrum OR to the patient network port on the Viewstation OR CPU.
- For each Spectrum OR that is connected to the Viewstation OR CPU through an Ethernet switch, straight Ethernet patch cables are used. One cable connects the CS1 port on the Comm Port of the Spectrum OR to an open port on the switch. A second cable connects an open port on the switch to the patient network port on the Viewstation OR CPU.

5.2.3 Display Connection to Viewstation OR CPU

5.2.3.1 Single Display

The display is connected to the Monitor 1 port on the Viewstation OR CPU as follows:

- If the distance between the Viewstation OR CPU and the display is less than 50 feet, a VGA to VGA cable is used. Additionally, if the display is a touch screen, connect a touch screen cable from P0 on the Viewstation OR CPU to the touch screen port on the display.
- If the distance between the Viewstation OR CPU and the display is more than 50 feet, a KVM Extender is used. Additionally, if the display is a touch screen, connect a touch screen cable from P0 on the Viewstation OR CPU to the KVM transmitter female serial port. Then attach another touch screen cable from the serial port on the KVM receiver to the touch screen port on the display.

5.2.3.2 Two Displays

- Both displays must have the same resolution and aspect ratio. The distance between the Viewstation OR CPU and the display must be less than 50 feet to use this configuration.
- Connect one end of a VGA cable to the Monitor 1 port on the Viewstation OR CPU (see FIGURE 5-1) and connect the other end to the Video Input port of the video splitter. From the video splitter, use VGA to VGA cables to connect the 2 VGA output ports to the displays. If a display has a touch screen, connect the touch screen cable from P0 on the CPU to the touch screen connector on the display.
- If the distance between the Viewstation OR CPU and the displays is more than 50 ft. a Longview Companion will be used. If the display has a touch screen, connect a touch screen cable from P0 on the Viewstation OR CPU to the KVM transmitter female serial port. Attach the touch screen cable from the serial port on the receiver to the touch screen port on the display.

5.2.4 Spectrum OR Communication Configuration

In order to communicate to the Viewstation OR CPU, each Spectrum OR must be configured for Ethernet protocol and have an IP Address and Subnet Mask ID assigned to it.

Follow the instructions for configuring a bedside monitor for wired networks.

1. Enter the Installation Menu by pressing and holding the **TRENDS** key during power up. Release the **TRENDS** key when the Installation Menu appears.
2. Go to the System Information Sub-Menu.
3. Set Enable Network to **Wired**.
4. Enter an IP Address that matches the IP Address scheme 7.6.6.X (where X = any number from 2 to 255). Do not duplicate an existing IP address that has been assigned to any other device on the network.
5. Ensure that the Subnet Mask ID is **255.255.255.0**.
6. Record the Device ID number. This number will be entered into the Viewstation OR Equipment Setup Tab.
7. Return to the previous menu by choosing **Previous Menu**.
8. Save the information by pressing **Save Current**.
9. Power cycle the monitor.

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6.0 *Appendix A*

6.1 Installing Viewstation OR Software 6-2

6.1 Installing Viewstation OR Software

6.1.1 Introduction

6.1.1.1 Required Parts and Equipment

DESCRIPTION	PART NUMBER
Software Installation Disc, Viewstation OR	0996-00-0170-0001
15 cm ruler (part of accessory kit)	0353-00-0004-01

6.1.1.2 Prerequisites

1. The Spectrum OR monitor must be configured to communicate with the Viewstation OR CPU.

- The Enable Network must be set to wired.
- A valid IP address and SubNet Mask must be entered.

2. All components of the system must be connected prior to installing the software.

- Spectrum OR monitor
- Independent display and mouse/touch pad
- KVM extender
- Ethernet network

6.1.2 Software Installation

NOTE: **It is imperative that you read and perform the steps listed in the Prerequisite section prior to starting the software installation.**

1. Remove the front cover from the Viewstation OR CPU

2. Insert the software installation CD and boot up the Viewstation OR CPU.

3. Select "Full Install" option.

4. Select "Yes" for the "Are you sure?" message.

a. Wait for the Ghost process to complete.

b. Wait for the additional files to be copied.

c. When the "Remove CD and reboot" message displays, remove the CD and verify the HDD LED is not illuminated.

d. Press the Ctrl, Alt and Del keys. A message will appear prompting to press any key to re-boot.

e. Press any key to re-boot the system.

5. After the re-boot, the **IDS System Installer** window opens (see FIGURE 6-1).

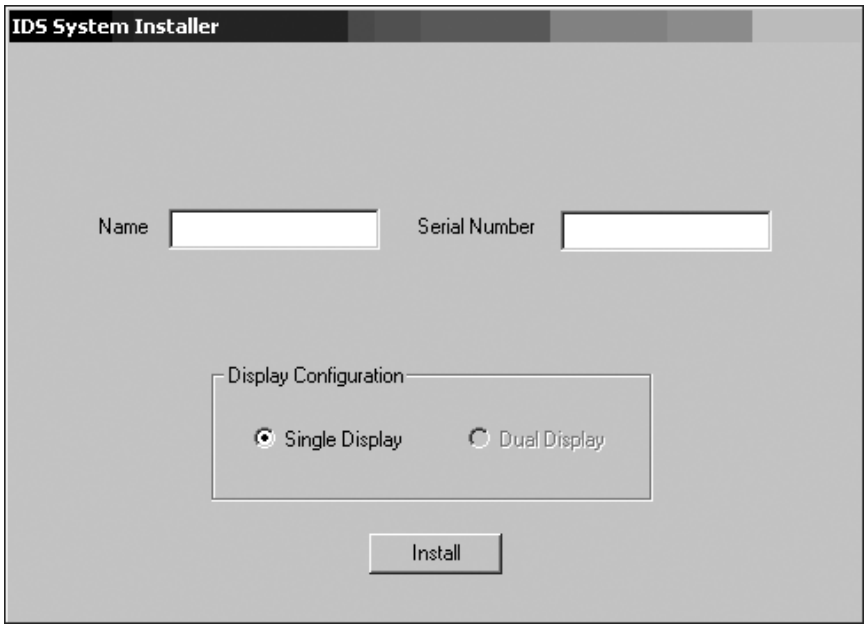

FIGURE 6-1 IDS System Installer Window

NOTE: Before typing any information turn off the Num Lock on the keyboard.

6. Enter the system name in the Name field. This name must be unique within the entire Hospital and Panorama networks. The name must contain only numbers and letters and can be no more than 15 characters long.

7. Type the serial number (located on the front panel of the computer) in the Serial Number field. (Do not use the dash in the serial number).

8. Click the **Install** button. When the installation is complete, the **IDS System Installer** window closes and the system will re-boot.

9. After re-booting, the desktop will be visible and then the first **IDS System Config Tool** will open (see FIGURE 6-2).

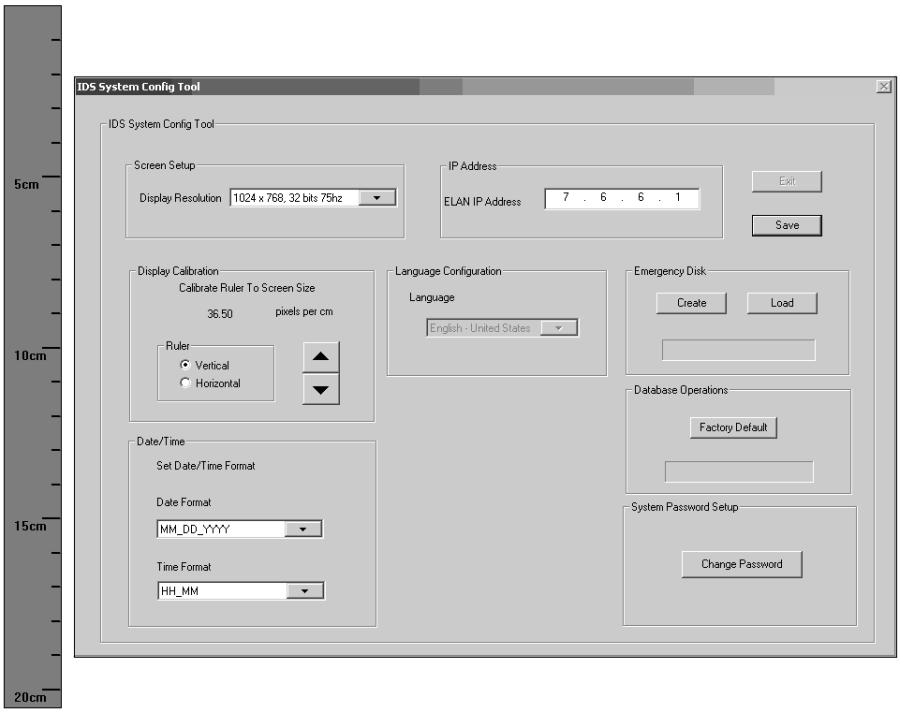

FIGURE 6-2 IDS System Config Tool

10. Set the ELAN IP address (7.6.6.1 is the default IP address). Change the address to avoid any future IP address error.

11. Select the Screen Resolution from the Screen Setup list box.

NOTE: **The Screen Setup drop down list box will only show supported display resolutions.**

12. Using the 15 cm ruler, calibrate the Vertical and Horizontal rulers for the proper screen size on the Independent display.

13. Select the Date and Time formats.

14. The default system password is **system**. If it needs to be changed, press the **Change Password** button, fill out the fields, and press **OK** (see FIGURE 6-3).

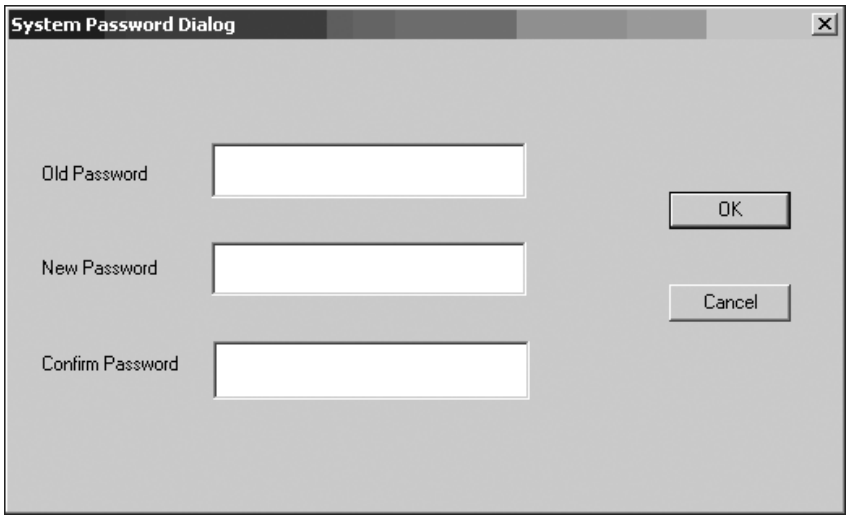

FIGURE 6-3 System Password Dialog

15. After the Password Dialog closes, click on the **Save Configuration** button to save.

NOTE: If a new display resolution was selected during configuration, it will be set when the Save button is pressed.

16. Click on the real-time clock in the lower right-hand corner of the display to set the current date and time for the Windows system. Select the **OK** button when all changes have been made. (do not alter the time zone setting).

NOTE: When in the monitoring mode, the Viewstation OR will display the connected monitor's time. If no patient is admitted, the time will not be displayed.

17. If the Viewstation OR network is setup to communicate to the Spectrum OR monitor through a crossover CAT5 cable, the Viewstation OR ELAN network card speed setting must be re-configured.

NOTE: If the Viewstation OR is connected to the Spectrum OR monitor via an ELAN switch, no configuration changes are required (the system is defaulted to 100Mbps/Full Duplex). Skip to step 18.

To change this setting:

- Press the **Start** key in the lower left of the display.
- Press **Control Panel**.
- Double click on the **Network Connections** Icon.
- Right click on the **ELAN** connection. Press **Properties**.
- Click on the **Configure** button next to the Network adapter name

- Select the **Advanced** Tab (see FIGURE 6-4 for reference).
- Select the **Link Speed & Duplex**. In the value window, select **100Mbps/Half Duplex**. Press **OK** to save the setting.

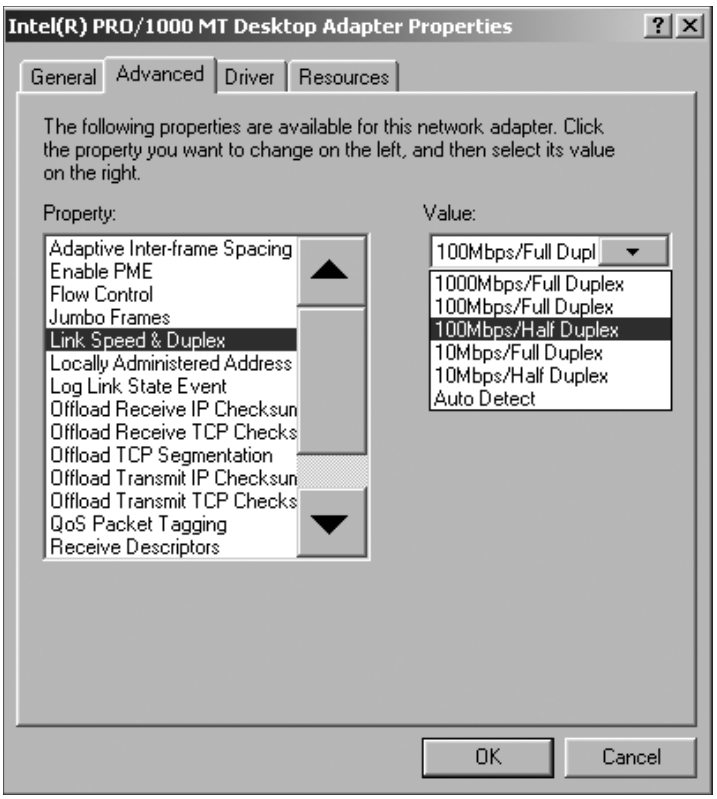

FIGURE 6-4 Network Connections Window

- Close the Network Connection window.

18. Restart the Viewstation OR CPU as follows:

a. Press the **Start** button in the lower left corner of the display.

b. Press the **Shut Down** icon in the dialog box.

c. From the pull-down menu, select **Restart** and press the **OK** button. The system should restart in normal display mode (see the example in FIGURE 6-5).

NOTE: **The example in FIGURE 6-5 depicts waveforms and digital data from a Spectrum OR that is actively monitoring a patient. Patient data may not be displayed depending on the current monitoring status of the Spectrum OR.**

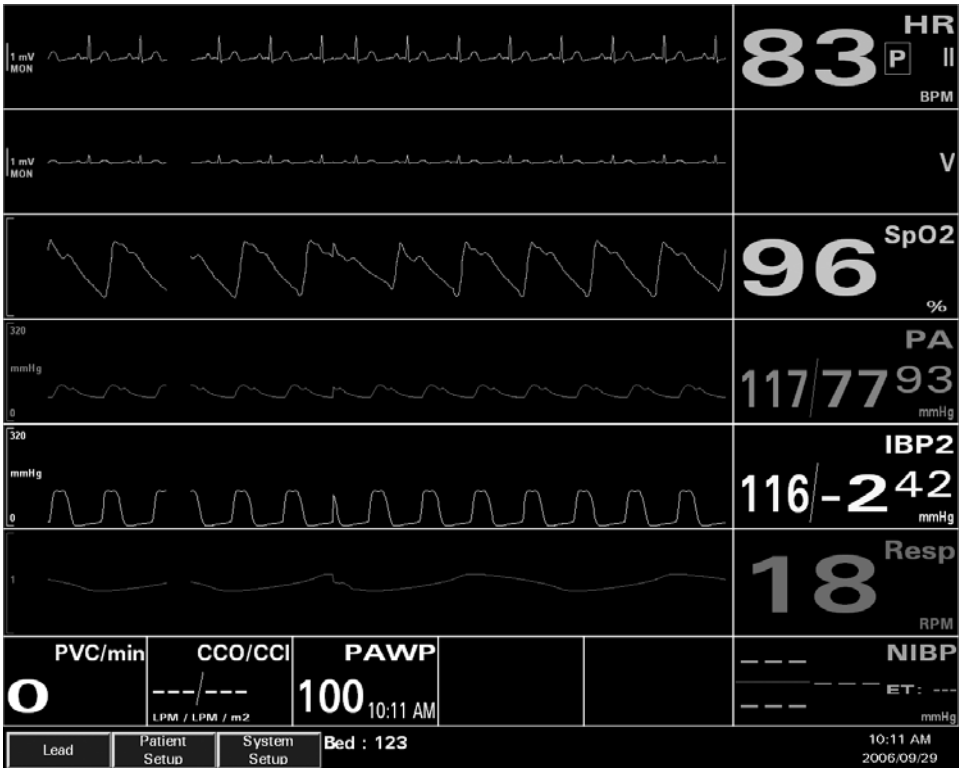

FIGURE 6-5 Example Normal Monitoring Mode

19. Verify that patient data from a specific Spectrum OR can be displayed through the Viewstation OR. With the Spectrum OR in normal monitoring mode and properly connected to the Viewstation OR network, proceed as follows:

a. From the Viewstation OR menu bar, select the **System Setup** button.

b. Select the **Equipment Setup** tab. From the **Equipment Setup** tab, disconnect any active equipment by selecting the **Disconnect** button.

c. Select the **Connect** button. The **Device ID** dialog box opens, listing all Spectrum OR bedside monitors available on the network.

d. Select the desired Spectrum OR to be connected.

e. Select the **Done** button.

The Spectrum OR data should now be displayed on the Viewstation OR.

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7.0 *Appendix B*

7.1 CMOS Setup/Verification 7-2
7.2 Independent Display Functional Requirements 7-7

7.1 CMOS Setup/Verification

Verify that the VGA and serial cables are connected between the display(s) and the CPU. Connect the keyboard and mouse/touch pad to the CPU.

Power ON the Viewstation OR CPU. While the memory test is being performed, press the **Del** key on the keyboard to enter the CMOS Setup menu. Follow the on-screen instructions to move through the menus and setup or verify the CMOS exactly as it appears below. When completed, select **SAVE to CMOS** and **EXIT** to enter these settings into memory.

7.1.1 BIOS SETUP Pentium 4 Motherboard

STANDARD CMOS SETUP

Date (mm:dd:yy)	Set to current Date
Time	Set to current Time
IDE Primary Master	** [ST380021A]
IDE Primary Slave	** [ST3200822A]
IDE Secondary Master	** [LITE-ON LTR-52246S] (or LTR-52327S)
IDE Secondary Slave	None
Drive A	1.44M, 3.5 in.
Drive B	None
Video	EGA/VGA
Halt On	All, But Keyboard
Base Memory	640K
Extended Memory	1047552K
Total Memory	1048576K

ADVANCED BIOS FEATURES

Virus Warning	Disabled
CPU L1 and L2 Cache	Enabled
Quick Power On Self Test	Enabled
First Boot Device	Floppy
Second Boot Device	CDROM
Third Boot Device	HDD-0
Boot Other Device	Enabled
Swap Floppy Drive	Disabled
Boot Up Floppy Seek	Disabled
Boot Up Numlock Status	On
Gate A20 Option	Fast
Typematic Rate Setting	Disabled
X Typematic Rate (chars/Sec)	6
X Typematic Delay (Msec)	250
Security Option	Setup
APIC Mode	Enabled
MPS Version Control for OS	1.4
OS Select For DRAM>64MB	Non-OS2
Report No FDD For WIN 95	Yes
Small Logo (EPA) Show	Enabled

ADVANCED CHIPSET FEATURES

DRAM timing Selectable	By SPD
X CAS Latency Time	2.5
X Active to Precharge Delay	7
X DRAM RAS# to CAS# Delay	3
X DRAM RAS# Precharge	3
Memory Frequency For	AUTO
System BIOS Cacheable	Enabled
Video BIOS Cacheable	Enabled
Delay Transaction	Enabled
Delay Prior to Thermal	16 Min
AGP Aperture Size (MB)	64
ICH4 LAN	Enabled
	** On-Chip VGA Setting **
On-Chip VGA	Enabled

ADVANCED CHIPSET FEATURES

On-Chip Frame Buffer	8 MB
Boot Display	Auto

INTEGRATED PERIPHERALS

On-Chip Primary PCI IDE	Enabled
IDE Primary Master PI0	Auto
IDE Primary Slave PI0	Auto
IDE Primary Master UDMA	Auto
IDE Primary Slave UDMA	Auto
On-Chip Secondary PCI IDE	Enabled
IDE Secondary Master PI0	Auto
IDE Secondary Slave PI0	Auto
IDE Secondary Master UDMA	Auto
IDE Secondary Slave UDMA	Auto
USB Controller	Enabled
USB 2.0 Controller	Enabled
USB Keyboard Support	Disabled
AC97 Audio	Auto
Init Display First	PCI Slot
IDE HDD block Mode	Enabled
POWER ON Function	BUTTON Only
X Hot Key Power On	Ctrl-F1
Onboard FDC Controller	Enabled
Onboard Serial Port 1	3F8/IRQ4
Onboard Serial Port 2	2F8/IRQ3
UART Mode Select	Normal
Onboard Parallel Port	378/IRQ7
Parallel Port Mode	SPP
PWRON After PWR-Fail	Off
Onboard Serial Port 3	3E8H
Serial Port 3 Use IRQ	IRQ5
Onboard Serial Port 4	2E8H
Serial Port 4 Use IRQ	IRQ10
Digital I/O	Disabled

POWER MANAGEMENT SETUP

ACPI Function	Enabled
Power Management	User Defined
Video Off Method	V/H Sync+ Blank
Video Off In Suspend	Yes
Suspend Type	Stop Grant
Modem Use	3
Suspend Mode	Disabled
HDD Power Down	Disabled
Soft-Off by PWR-BTTN	Instant-Off
CPU THRM-Throttling	50.0%
Wake-Up by PCI Card	Disabled
Power On by Ring	Disabled
Resume by Alarm	Disabled
X Date (of Month) Alarm	0
X Time (hh:mm:ss) Alarm	0:0:0
	Reload Global Timer Events
Primary IDE 0	Enabled
Primary IDE 1	Enabled
Secondary IDE 0	Enabled
Secondary IDE 1	Enabled
FDD, COM, LPT Port	Enabled
PCI PIRQ[A-D]#	Enabled

PNP/PCI CONFIGURATIONS

PNP OS Install	No
Reset Configuration Data	Disabled
Resources Controlled By	Auto(ESCD)
X IRQ Resources	
X DMA resources	
PCI/VGA Palette Snoop	Disabled

PC HEALTH STATUS

CPU Warning Temperature	Disabled
System Temp	**
CPU Temp	**
Chassis Temp	**
CPU FAN Speed (FAN1)	**

PC HEALTH STATUS	
System FAN Speed (FAN2)	0 RPM
Chassis FAN Speed (FAN3)	0 RPM
Vcore (V)	**
VCC3(V)	**
+5(V)	**
+12(V)	**
-12(V)	**
VBAT	**
5VSB(V)	**
Shutdown Temperature	Disabled
CPU Fan Failure Warning	Enabled
Sys. Fan Failure Warning	Disabled
Aux. Fan Failure Warning	Disabled

FREQUENCY/VOLTAGE CONTROL	
Auto Detect PCI Clk	Disabled
Spread Spectrum Modulated	Enabled

7.2 Independent Display Functional Requirements

7.2.1 Electrical Requirements

7.2.1.1 Power Supply

The power supply accepts the input voltage and frequency range of local power distributors, such as 120VAC, 60Hz for domestic (US/CANADA) installations, 230VAC, 50Hz for European installations, and 240VAC, 50Hz for UK installations.

7.2.1.2 Display Resolution

The independent display supports one of the following as a native resolution:

- **a.** 1920 x 1080
- **b.** 1706 x 960
- **c.** 1366 x 768
- **d.** 1280 x 1024
- **e.** 1024 x 768

7.2.1.3 Display Aspect Ratio

The independent display supports at least one of the following image aspect ratios:

- **a.** 16:9 or 16:10
- **b.** 5:4
- **c.** 4:3

7.2.1.4 Color Support

The independent display supports at least a 24-bit (16.7 million color) palette.

7.2.1.5 Image Brightness

The independent display image brightness is determined by the customer.

7.2.1.6 Image Contrast

The independent display image contrast ratio is determined by the customer.

7.2.1.7 Viewing Angle

The independent display Horizontal and Vertical viewing angles are determined by the customer.

7.2.2 Mechanical Requirements

7.2.2.1 Connectors (Cable Termination at the Viewstation OR PC)

The independent display includes a display video interface cable, 6 ft. length minimum. The cable must terminate at the Viewstation OR CPU with a standard analog video input 15-pin HD15 "VGA" male connector (for analog RGB).

7.2.2.2 Mounting

The mounting method of the independent display is determined by the customer.

7.2.3 Environmental and Agency Requirements

7.2.3.1 Compliance

Operating Temperature, Humidity & Elevation Requirements

REQUIREMENT DESCRIPTION	TEST LIMITS & NOTES
Temperature	+10 to +40 degrees Celsius
Humidity	20% to 80% non-condensing

Safety

It is recommended that the independent display comply with the requirements of Council Directive 93/42/EEC Medical Device Directive (MDD) for safety and electromagnetic emissions and immunity.

If the customer chooses a display that only meets the safety requirements of UL 60950-1/ CSA C22.2 No. 60950-1 (for EU, Council Directive 73/23/EEC), then a medical isolation transformer must be installed in series with the display's power supply and the AC mains if the display is in the Patient vicinity.

With either MDD (for US/CAN: UL 60601-1) or 73/23/EEC (for US/CAN: UL 60950-1/ CSA C22.2 No. 60950-1) compliance, the external labeling shall indicate that the display has been tested to and successfully passed those requirements by bearing the "UL", "C-UL", "CSA" mark, or any other NRTL- approved agency mark(s). The display will bear at least one of these marks.

EMI/EMC

If the customer chooses a display that only meets the (ITE) requirements of Council Directive 89/336/EEC for electromagnetic emissions (EN 55022, EN 61000-3-2, EN 61000-3-3) and immunity (EN 55024), then the display, when connected to the Viewstation OR PC, may experience degraded performance due to its lower (non-MDD-compliant) electromagnetic immunity.

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